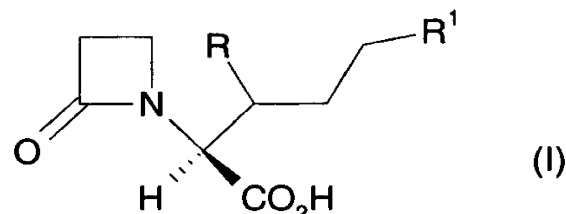


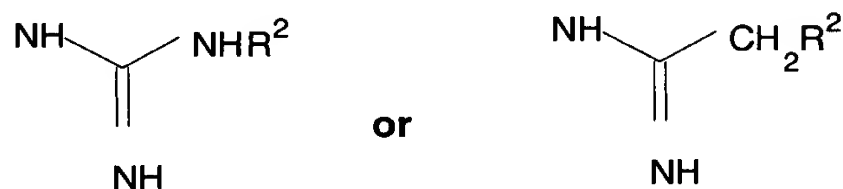
**In the Claims:**

Claims 1-14 (Cancelled)

15. (Currently amended) A process for preparing compounds of formula (I)



wherein R is H or OH and R<sup>1</sup> is



and where R<sup>2</sup> = H or C<sub>1-6</sub> alkyl

comprising the steps of:

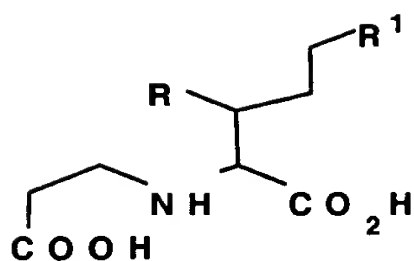
a) culturing a host cell comprising a vector comprising an isolated polynucleotide encoding a polypeptide comprising a sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2 and having  $\beta$ -lactam synthetase activity;

b) harvesting said host cell;

c) at least partially purifying said polypeptide;

~~a) producing an isolated polypeptide, having  $\beta$ -lactam synthetase activity, in a host cell using a vector comprising an isolated polynucleotide encoding said polypeptide, wherein the polypeptide comprises a sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2; and~~

d) contacting said at least partially purified polypeptide with a compound of formula (II)

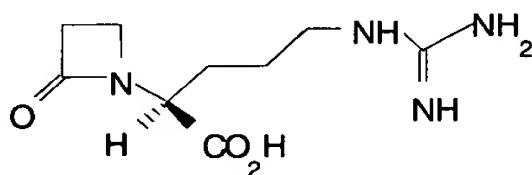


(II)

where the variables are as defined in formula (I).

~~with said isolated polypeptide.~~

16. (Currently amended) A process for preparing a compound of formula (IV)



(IV)

comprising the steps of:

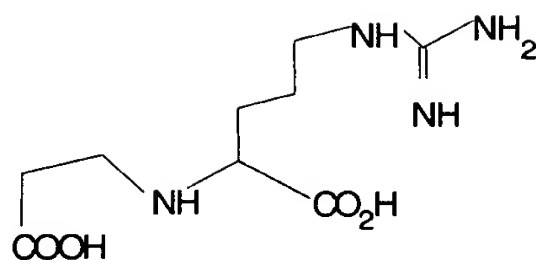
a) culturing a host cell comprising a vector comprising an isolated polynucleotide encoding a polypeptide comprising a sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2 and having  $\beta$ -lactam synthetase activity;

b) harvesting said host cell;

c) at least partially purifying said polypeptide; and

~~a) producing an isolated polypeptide, having  $\beta$ -lactam synthetase activity, in a host cell using a vector comprising an isolated polynucleotide encoding said polypeptide, wherein the polypeptide comprises a sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2; and~~

d)b) contacting said at least partially purified polypeptide with N<sup>2</sup>-(2-carboxyethyl)-(S)-arginine;  
formula (III)



(III)

~~with said isolated polypeptide.~~

17. (Previously presented) A process according to claim 15 or 16 wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:2.

18. (Currently amended) A process according to claim 15 or 16 wherein the polypeptide ~~has~~ consists of the amino acid sequence of SEQ ID NO:2.

19. (Cancelled)

20. (Cancelled)

21. (Withdrawn) A recombinant vector comprising a polynucleotide capable of producing the polypeptide defined in claim 15 when said vector is present in a compatible host.

22. (Withdrawn) A recombinant vector according to claim 21 comprising a polynucleotide selected from the group:

a) a polynucleotide encoding a polypeptide having at least 95% identity with the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2;

b) a polynucleotide comprising the polynucleotide sequence of SEQ ID NO:1; or

c) a polynucleotide having the polynucleotide sequence of SEQ ID NO:1.

23. (Canceled)

24. (Withdrawn) A host microorganism containing a recombinant vector of claims 21 or 22.

25. (Withdrawn) A host microorganism according to claim 24 which is selected from *Streptomyces*, or *E.coli*.

26. (Withdrawn) A process for preparing an enzyme having  $\beta$ -lactam synthetase activity which comprises the steps:

- a) culturing *Streptomyces clavuligerus*,
- b) harvesting and lysing the mycelium, and
- c) isolating a polypeptide having at least 95% identity with the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2, and having  $\beta$ -lactam synthetase activity.

27. (Withdrawn) A process for preparing an enzyme having  $\beta$ -lactam synthetase activity which comprises the steps:

- a) culturing a host microorganism transformed with a recombinant vector according to claims 21 or 22, and
- b) isolating the polypeptide having at least 95% identity with the amino acid sequence of SEQ ID NO:2 over the entire length of SEQ ID NO:2, and having  $\beta$ -lactam synthetase activity.

28. (Withdrawn) A process for preparing clavulanic acid comprising preparing a compound of formula (IV) in accordance with claim 16 or any claim dependent thereon, and then converting the compound of formula (IV) to clavulanic acid by treatment with an enzyme system derived from *Streptomyces clavuligerus*.

29. (Previously Presented) The process of claim 15, wherein said isolated polynucleotide comprises SEQ ID NO:1.

30. (Previously Presented) The process of claim 16, wherein said isolated polynucleotide comprises SEQ ID NO:1.

31. (New) The process of claim 15, wherein said polypeptide is at least partially purified by a method selected from the group consisting of: ammonium sulfate precipitation, ethanol precipitation, acid extraction, anion exchange chromatography, cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography.

32. (New) The process of claim 16, wherein said polypeptide is at least partially purified by a method selected from the group consisting of: ammonium sulfate precipitation, ethanol precipitation, acid extraction, anion exchange chromatography, cation exchange chromatography, phosphocellulose

Serial No.: 09/743,209  
Group Art Unit No.: 1652

chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography.